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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,440	12/13/2005	Aiko Otsuka	123049	6847

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EXAMINER	
BERNS, DANIEL J	

ART UNIT	PAPER NUMBER
4162	

MAIL DATE	DELIVERY MODE
09/26/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,440	OTSUKA ET AL.	
	Examiner	Art Unit	
	DANIEL BERNS, ESQ.	4162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1-5-2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *3/11/2005 & 1/5/2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3-11-2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The disclosure is objected to because of the following informalities: paragraph 0020 of applicant's Pre-grant Publication No. US2006/0154068 (published 7/13/06) contains the phrase "by a extruder[.]" This phrase is grammatically incorrect, and should read "by an extruder[.]" Paragraph 0036 thereof contains the phrase "silt width[,]" which appears to be a misspelling of "slit width[,]" and has been treated as such for examination purposes - the latter phrase appearing more contextually apt. Appropriate corrections are required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-2 and 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al., Japanese Pat. No. JP04-280088 (1992) ("Inoue") in view of Konig et al., Pat. No. 5,389,585 (1995) ("Konig"). Regarding claims 1-2 and 5, Inoue teaches a method of making a honeycomb structure by kneading and subsequently extruding a mull comprising 5.5 μm diameter SiC powder and water, yielding a honeycomb of 0.5 mm rib thickness (i.e.: the SiC particulate diam. is 0.011 x the honeycomb's rib thickness) after drying, heating and sintering/calcination. *See* Inoue at Derwent English Abstract. Inoue does not, however, teach a logarithmic standard deviation of its SiC particulate size distribution of 0.15-0.40 or 0.17-0.40, or that less than 5 wt. % of its honeycomb precursor particles possess a particulate diameter of 50% or more of the honeycomb's rib thickness. These limitations, though, are taught by Konig. For its part, Konig teaches the production of non-oxide ceramic powders such as SiC wherein <1% of said powders' particles deviate more than 40% from the average particle size and no such particles deviate more than 60% therefrom, with a preferred condition wherein <1% of such particles deviate more than 10% from the average particle size and no such particles deviate more than 40% therefrom. *See* Konig at col. 2, ln. 65 to col. 3, ln. 15. Thus, even a 60% deviation from a particle diam. of 5.5 μm would yield a particle of only 8.8 μm diam. (160% x 5.5 μm = 8.8 μm), far less than 115 μm (which would be equal to the honeycomb rib thickness x 0.23); a 40% or less deviation from 5.5 μm would thus shy ever more from the 115 μm diameter limit. Konig further states that powders of high purity and devoid of "coarse-grained portions" (i.e.: particles with high deviations from the average particle size) "have a favourable effect on

the characteristics of [the] corresponding components [made therefrom]." *See id.* at col. 1, ln. 15-18. Given such an endorsement of the relative cohesiveness and uniformity of particle sizes vis-à-vis the structures that the particles will be incorporated into, it would have been obvious to one of ordinary skill in the art at the time of the invention to employ SiC powder of Inoue's particulate sizing while maintaining a particle size deviation within Konig's limits to produce a structurally-sound honeycomb as described in Inoue.

Regarding claim 4, utilizing Inoue's parameters of 5.5 μm SiC particles and 0.5 mm honeycomb rib thickness, claim 4 would then dictate that <5 wt. % of the SiC particles could be of 250 or more μm in diameter. Employing the desirability of Konig's particulate size deviation parameters in sizing SiC particles for making Inoue's honeycomb as described above, even a 60% deviation from an SiC particle diameter of 5.5 μm would merely yield a particle of 8.8 μm as explained above, far smaller than the 250 μm threshold limitation of claim 4 as applied to Inoue's 0.5 mm (500 μm) honeycomb rib thickness. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention that in the production of a honeycomb such as Inoue's, virtually no SiC particle of Inoue's sizing, produced in light of Konig's size deviation limits, would be 250 or more μm in diameter.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue in view of Konig as applied to claim 1 above, further in view of Morimoto et al., WIPO Publication No. WO02/070433 (published 9/12/2002) ("Morimoto"). Whereas Inoue and Konig do not collectively disclose employing 50 or more wt. % SiC in making their honeycomb structure, this limitation is taught by Morimoto. Morimoto teaches the making of a honeycomb structure comprising SiC and cordierite, wherein SiC is present in a content ratio of 40-90 vol. % of the

whole. *See* Morimoto at English abstract. Given the respective densities of SiC and cordierite as 3.17-3.25 (*see* Harris, Gary L. (Ed.) *Properties of Silicon Carbide* (p. 3). Inst. of Engineering (1995) (visited online on 9/16/08 – *see* PTO 892 for URL)) and 2.5-2.8 (*see* "Cordierite." Grolier Multimedia Encyclopedia (2008) (visited online on 9/16/08 – *see* PTO 892 for URL)), converting Morimoto's SiC volume % range to a wt. % range yields SiC values therein of 43-92 wt. %.[1] Hence, given the successful construction of a honeycomb structure predominantly employing 50+ wt. % SiC as taught by Morimoto, it would have been obvious to one of ordinary skill in the art at the time of the invention to form Inoue and Konig's honeycomb with 50 wt. % or more SiC.

Conclusion

7. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: of Campbell, Pre-grant Publication No. US2003/0072917 (published 4/17/2003) ("Campbell"). For its part, Campbell teaches the production of plastic molds comprising particulate materials such as SiC wherein said SiC particles are of 5-80 μm diameter, 80-98 wt. % of which deviate no more than about 15% size-wise therefrom. *See* Campbell at par. 0021-23, 0036, and 0039. Campbell does not, however, provide a motivational statement as to why such a size-wise particulate deviation is advantageous, or that materials of such characteristics are useful for manufacturing honeycombs or structures other than plastic molds.

[1] Since density = mass/volume and thus density x volume = mass, the lowest wt. % of SiC is calculated as follows: (3.17 g/cm^3 SiC) x (40 vol. % SiC) = 1.27, and (2.8 g/cm^3 cordierite) x (60 vol. % cordierite) = 1.68, and thus wt. % SiC = (1.27) / (1.27 + 1.68) = 43 wt. %. This value is the low end of the wt. % SiC range, since the lowest vol. % and density values for SiC were employed, and the highest vol. % and density values for cordierite were employed. Conversely, the highest wt. % SiC value is calculated by employing the highest SiC vol. % and density values, along with the lowest cordierite vol. % and density values. So, when (3.25 g/cm^3 SiC) x (90 vol. % SiC) = 2.93, and (2.5 g/cm^3 cordierite) x (10 vol. % cordierite) = 0.25, the wt. % SiC = (2.93) / (2.93 + 0.25) = 92 wt. %. This is the high end of the wt. % SiC range.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL BERNS, ESQ. whose telephone number is (571)270-5839. The examiner can normally be reached on Monday thru Thursday, 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached at (571)272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DB/ September 17, 2008

/Jennifer McNeil/
Supervisory Patent Examiner, Art Unit 4162